UCRL-JC-123949 Abs

International Conference
SHOCK WAVES IN CONDENSED MATTER
St. Petersburg, Russia, September 2-6, 1996

Utility of Coupling Nonlinear Optimization Methods with Numerical Modeling Software [1]

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Abstract

The utility of coupling nonlinear optimization methods with numerical modeling software will be described in this paper. The results of using GLO (Global Local Optimizer), a general purpose nonlinear optimization software package for investigating multi-parameter problems in science and engineering will be discussed. The software package consists of the modular optimization control system (GLO), a graphical user interface (GLO-GUI), a pre-processor (GLO-PUT), a post-processor (GLO-GET), and nonlinear optimization software modules, GLOBAL & LOCAL GLO is designed for controlling and easy coupling to any scientific software application. GLO runs the optimization module and scientific software application in an iterative loop. At each iteration, the optimization module supplies new values for a set of parameters that are being optimized. GLO-PUT inserts the new parameter values into the input file of the scientific application. GLO runs the application with the new parameter values. GLO-GET determines the value of the objective function by extracting the results of the analysis and comparing to the desired result. GLO continues to run the scientific application over and over until it finds the "best" set of parameters by minimizing (or maximizing) the objective function. Two example problems showing the optimization of material model parameters and the determination of an optimum design geometry will be presented.

Topical Area: Advances in Numerical Modeling Technology
Presentation: Prefer oral, will accept poster

[1] Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.